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CANADA  
DEPARTMENT OF MINES  
HON. W. A. GORDON, MINISTER; CHARLES CAMSELL, DEPUTY MINISTER  
**EXPLOSIVES DIVISION**  
LT.-COL. G. OGILVIE, CHIEF INSPECTOR

ANNUAL REPORT

OF THE

**EXPLOSIVES DIVISION**

OF THE

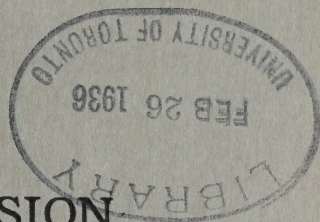
**DEPARTMENT OF MINES**

FOR THE CALENDAR YEAR

1934



OTTAWA  
J. O. PATENAUDE  
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY  
1935





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**ANNUAL REPORT  
OF THE  
EXPLOSIVES DIVISION OF THE DEPARTMENT OF MINES  
FOR THE CALENDAR YEAR 1934**

BY

Lt.-Col. G. Ogilvie, C.M.G.

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The following report deals with the administration of the Explosives Act during the year ending December 31, 1934.

**MANUFACTURE OF EXPLOSIVES**

The explosives factories, which were under licence and in operation during the whole or part of the year 1934, are detailed in Appendix A. There is no change in the number (ten) of licensed factories. The North Star Explosives Company having ceased operation of their factory at Prescott, Ontario, the licence for that factory was not renewed, but a licence was issued to the Canadian Industries, Limited for a new factory—the “Brainerd” factory, established near Selkirk, Manitoba—which was brought into production in December. Inspectors of the Division made 26 factory inspections during the year and 3 supplementary visits of inspection were made by deputy inspectors of the Royal Canadian Mounted Police.

In Appendix B will be found a statement of the total production of explosives, arranged according to class of explosives. The first three classes embrace all commercial blasting explosives as dynamites and black powders, and it is to be noted that these total approximately 23,283 tons marking, by an increase of 29·5 per cent on the production of 1933, a continuance of the rise, in measure with the growing demand of the period, from the low level of 1932.

**ACCIDENTS IN MANUFACTURE**

An explosion, which occurred in an electric detonator coiling room at the Brownsburg factory of the Canadian Industries, Limited on August 1, took toll of the life of a young employee, Miss Corinne St. Onge, whilst engaged in her normal routine of duty.

Her task was to coil the long leads of electric detonators to the form suitable for packing. The operator, when coiling, is seated at a bench on which is the coiling spindle and, taking one detonator at a time from a supply on the bench behind a wooden shield at her left, coils the leads and places the finished work behind a shield on her right until 50 detonators are there collected. These are then removed to a further position of safety.

As, however, the explosion undoubtedly occurred just prior to when Miss St. Onge would have sat down to commence coiling, it is necessary to consider, in more detail, the procedure followed preparatory to the coiling operation proper. The electric detonators, in this case No. 8 detonators with 6-foot leads, are brought to the coiling room in bundles of 100, two of which are placed on the bench. The detonators themselves are laid on a thick soft-rubber mat, near to the shield to which reference has been made, with their leads lying along the bench to the left and held in place by a soft weighted bag near their ends. The leads are lightly bound together by short lengths of wire. The operator cuts these off with scissors, removes also the work tabs and places scissors and tabs in a rack at the back of the bench. Each bundle usually includes two or three pairs of leads with composition plugs only, these not having been inserted in detonators at the previous "capping" operation by reason of some defect, as broken bridges, observed on inspection at that stage. It is the practice of the coiling operator to remove these just before starting to coil. It may here be mentioned also that, in consequence of this removal of the "rejects" from tagged bundles of detonators, a few more tags are received in the course of a day than are used. At the time of the accident, 1.40 p.m., a surplus of two or three tags was to be expected in the rack.

The explosion clearly occurred when the deceased was standing in front of the detonators laid out on the bench and probably while arranging them preparatory to coiling. The two bundles, of 100 each, were involved in the explosion; 30 coiled detonators behind the shield on the right were unaffected; 194 pairs of leads were found tangled together, suggesting that a few had been removed before the explosion. The scissors were in the rack, also seven work tags there or on the bench in front. The injuries sustained by the deceased pointed to her right hand having been over the detonators at the time of explosion and her left, which was lacerated on the back, probably holding in place or disentangling the leads. It is believed she was engaged in picking out the few "rejects."

Two possible causes of the accident suggest themselves: one, that in jerking out a plug, a detonator, with leads entangled, was inadvertently knocked against the wooden shield; the other, that a pull, similarly imparted to a detonator, was exercised against its wires held stationary by the weighted bag and possibly also by the operator's left hand, and that this may have caused a movement of the plug within the detonator. If this occurred, crystals of fulminate might have been broken down by the friction between plug and wall of detonator and so initiated explosion. Such movement would be possible only if the sulphur filling at the "capping" operation had been ineffective. In view of the precautions taken this is improbable, but trials were carried out with specially made defective detonators. In one or two instances the plug was pulled out, but more often, when there was any movement at all, the wires were pulled through the plug. The fact that no explosion was achieved is not proof that the explosion could not result from a movement of the plug, but as any movement resulted only in detonators made defective to a degree not encountered in practice, and as the pull exerted was clearly greater than that at all likely to be brought about in the manner indicated, the probability of the explosion having been caused in this way is, at least, remote.

Impact tests made with normal detonators, and with detonators with selected defective shells, did not provide any informative results. This was not unexpected. Detonators, as a rule, fortunately, do stand much rough treatment; unfortunately the rule has its exceptions as it is by no means unknown for explosion to result from a relatively light blow, and one is forced to the conclusion that the explosion was brought about by an accidental blow given to one of the detonators, and very probably against the wooden shield. The shields have been re-designed and provided with protective rubber screens.

Other accidents in manufacture resulted in minor injuries to two persons. At the Macdonald Metal Products Company's factory at Waterloo, Quebec, an employee sustained burns on a hand by the firing of a sheet of caps for toy pistols when he was cutting it. The sheet had evidently been fed to the cutter slightly off the straight, with the result that the blade cut into some of the loaded caps.

A fire broke out in a dry tetryl store-house at the Brownsburg factory of the Canadian Industries, Limited one and one-half hours after it had been visited. The fire was attributed to spontaneous combustion. As it was thought possible that this might have been initiated by the undetected presence of grease on one of the cardboard boxes used, these have been replaced by containers with smooth non-absorbent surfaces.

At the same factory an operator received injuries to two fingers by the explosion of an electric detonator in a "capping" block when the composition plug was being inserted. The design of the block was such as prevented the explosion of adjacent caps.

#### MAGAZINES

The number of permanent magazines varies but little from year to year; a few cease operation and a few are added. At the end of the year there were 348 under licence, a net increase of 5. Greater fluctuation is observable in the number of licences granted for temporary magazines. These amounted to 197, being 29 in excess of the number issued in the course of the year preceding.

The manner in which permanent magazines, operated by those dealers whose trade in explosives is extensive, are maintained seldom calls for even minor criticism, but, when that trade is only a small fraction of the general business, inspections occasionally still bring to light conditions which would not have been expected had the owners given more of their personal attention to the maintenance of their magazines. Thus, timely observation of the need for minor repairs to buildings and barricades would save greater expense later; prompt dealing with any encroachment of undergrowth near to a magazine would lessen the fire hazard at the cost of very little labour; insistence that the trucker, making deliveries of explosives, draw on older stocks first should obviate the risk of deterioration of any of the stock due to protracted storage. The quantity of explosives condemned on inspection is still considerable, although decreasing. Distributed over 23 magazines 1,650 pounds of dynamite and 790 pounds of black powder (including old stock at a northern trading post to the amount of 630 pounds) were condemned and destroyed—except 150 pounds of dynamite held for destruction in the spring.

A bush fire swept on to a temporary magazine containing 90 cases of dynamite for use in road construction. These exploded. No one was injured and indeed, the explosion was regarded as fortunate for it had the effect of stopping the advance of the fire towards a ninety foot bridge, which otherwise would have been destroyed.

Inspectors of the Division made 379 inspections of magazines and 194 were made by deputy inspectors of the Royal Canadian Mounted Police. Inspections of magazines at Cameron Bay, N.W.T., were also made by the Deputy Inspector of Explosives of the Dominion Lands Branch, and reports on the inspection of six magazines in outlying regions of British Columbia were received through the courtesy of the Commissioner, British Columbia Provincial Police.

### **THEFTS OF EXPLOSIVES**

A gratifying decrease, both in the number of magazines broken into and in the quantity of explosives stolen, marks the record of thefts of explosives during the year. Eight magazines were forcibly entered (one twice) and a total of 199 pounds of dynamite, 1,250 detonators and 325 feet of fuse stolen. A report of a theft of 300 pounds of dynamite from a magazine in 1933 was received too late for inclusion in the last Annual Report.

No case of theft from a temporary magazine is known, which suggests that the closer supervision urged over construction camp magazines has been effectively exercised. The small supplies held at places of work have not had the same immunity. From one such small stock 15 pounds of dynamite were taken. From another 9½ pounds of dynamite, 7 detonators, and 5 feet of fuse were stolen and the theft traced to one of the employees who was prosecuted and convicted. These explosives were recovered as were also 6½ pounds of dynamite taken by boys from a third work party. From stocks held in two municipal yards and one contractor's yard, losses amounting to 45 pounds of dynamite, 250 detonators, and 150 feet of fuse are also attributed to theft.

### **EXPLOSIVES FOUND**

Forgetfulness, by private users of explosives, of the necessity of removing or destroying any explosives remaining in their charge when vacating a house, probably accounts for most of the 25 pounds of dynamite, 25 pounds blasting powder and 203 detonators found on nine properties by later tenants. To similar negligence by work parties may be ascribed the finding by children of 50 pounds of dynamite in the bush near to where road construction had been in progress some time previously. The children wisely reported their find. Another case containing 50 pounds was found abandoned on a lake shore, 4½ pounds on the site of an old camp and 2 pounds near a wharf; a case of 50 pounds, picked up on a highway, was believed to have fallen off a badly loaded truck. Examination of the wreck of a scow disclosed 8 pounds of dynamite. Two instances were reported of the finding of explosives in coal.

By dint, mainly, of the supervision exercised by the Royal Canadian Mounted Police detachments over the activities of users of explosives, much has been accomplished towards minimizing the chance of explosives being left at places of work. As has been seen, however, the other sources of

abandoned explosives are various, and the wider realization of the dangers lurking in any unguarded explosives, and to which the police continually call attention, has done much to evoke the volunteering of helpful information by those who may have found or heard of abandoned explosives. In this brief review of explosives found regard is paid to the findings of explosives which, to all appearance, have been lost or carelessly forgotten; but account is not taken of the few detonators, or small quantities of other explosives, which may have been found or pilfered by children and to which reference is made in the detail of accidents.

Nor is note taken of an occasional instance of the finding of explosives in the course of police search where the keeping of explosives may be associated with a criminal purpose, and which probably leads to a criminal prosecution. It was observed that one such case led to the conviction of two men on a charge of unlawful possession of explosives, with the imposition of sentences of two and three years imprisonment.

### UNLICENSED PREMISES

Routine inspections of stores in which cartridges for firearms, also small quantities of explosives, are kept for sale have shown the records of sales generally well kept, except in a few outlying localities which it has not been practicable to visit for some time. The deputy inspectors of explosives of the Royal Canadian Mounted Police have been able to rectify this in great measure and it is expected that the instructions and cautions given by them will prove all that is needed. The great majority of dealers who regularly carry on a small trade in explosives know, and observe, the regulations relating to the use of detached stores and receptacles for explosives. These are not overlooked, but of greater importance to the public safety is the task of finding work parties, in the cities as well as in rural districts, which have explosives in use, and in ensuring that these are properly safeguarded. Special attention has been given to this work wherever possible. Inspectors of this Division made 779 inspections of unlicensed premises and about 2,400 were made by deputy inspectors of the Royal Canadian Mounted Police.

### IMPORTATIONS

The quantities of explosives of the several classes imported during the year, as detailed in Appendix C, do not show great variation from those of the year 1933. The importations were made under the authority of 513 permits and 34 special permits.

The explosives of Classes II and III consist almost entirely of nitro-compounds of Class III for use in manufacture of explosives and lacquers, also as propellants. The most of the small remainder represents the importation of liquid nitroglycerine for immediate use in the oil fields.

The importations of fireworks, which had fallen considerably the previous year, show a slight increase. Approximately 65 per cent of these comprised shipments of Chinese fireworks. It is satisfactory to note a reduction, from 13 per cent to 5 per cent, in the rejections of Chinese fireworks presented for importation. There were no rejections of fire-

works, other than Chinese. This particularly gratifying record is due to the care now taken by foreign manufacturers, regularly supplying Canadian dealers, to offer only those varieties which have been authorized.

### AUTHORIZATION OF EXPLOSIVES

Six new explosives were submitted for authorization and of these three were authorized. In addition, 30 examinations were made of authorized explosives. Many new varieties of fireworks were presented for examination, as a result of which 98 were authorized and 24 refused authorization. The checks made on imported shipments of fireworks called for 168 examinations involving chemical determinations of which 105 were carried out by the Dominion Analyst at Vancouver. Eleven shipments or part shipments were refused entry, the samples selected from these having been found unacceptable.

### PROSECUTIONS

Proceedings were taken against two contractors, who were found to have explosives in their possession in excess of the quantity allowed to be kept elsewhere than in licensed factories or magazines. They were convicted and fined.

Two private users of explosives and one contractor were also fined for failure to keep small quantities of explosives in locked receptacles.

A fine was imposed on a man convicted of leaving a car containing five cases of explosives in a city street.

### ACCIDENTS

*In Conveyance.* Information was received of one accident which occurred in the conveyance of explosives, as strictly interpreted. Rightly deciding that a few sticks of dynamite and some detonators, left at a place where he had been working previously, should be put in proper storage, a man placed them together in a case for removal. The danger of this practice was tragically demonstrated for, proceeding on his way with his load, he stumbled and fell, so bringing about an explosion, of the dynamite as well as the detonators, by which he lost his life.

*In Use.* Accidents in the use of explosives showed a disquieting increase, the casualties during the year amounting to 30 persons killed and 196 injured, whereas the figures for 1933 were 19 killed and 90 injured. The number of killed may not appear strikingly large—although it should be capable of much reduction—when the increased consumption of explosives is considered but, making due allowance for this factor, the frequency of accidents causing injury is about 30 per cent greater than was the average in recent years. A summary of the accidents is given in Appendix D and, if that be compared with the summary given in the last report, it will be observed that the increase is noticeable both in accidents occurring in mines and quarries and in those associated with use elsewhere.

*In Use Elsewhere Than in Mines and Quarries.* This increase, however, is far more striking in the case of accidents occurring elsewhere than in mines and quarries. The number of persons killed and injured in this way increased from 8 and 32, respectively, in 1933 to 15 and 107 in 1934.

The greater part of this increase is due to projected debris or failure to take proper cover, which alone accounts for 3 more deaths and 42 more persons injured than were attributable to the same cause during the year preceeding. Casualties due to accidents when preparing charges, and from failing to get away from the shot hole, including the use of short fuse, totalled 1 person killed and 23 injured, representing also a greater prevalence than in 1933 when as a result of like accidents 3 were killed and 6 injured.

*Preventative Measures.* Accidents of these classes are unquestionably attributable, in large measure at least, to negligence, and can be combatted successfully only by instruction and discipline. That they were so many may, to some extent, be attributed to the conditions arising from the great increase in the number of road construction camps established. Practically each camp of 100 men or so and each organized group of resident workers, may be said to require its own shot-firer. In the result the demand for shot-firers inevitably exceeds the supply of men of extensive experience. This difficulty has been felt more acutely in some districts than in others and, to cope with it, the authorities concerned provided for more thorough instruction being given in the safe handling of explosives. Towards the end of the year a falling off in the accidents reported was noticeable and this, continued as it has been through the months of January and February, gives warrant for the hope that the measures taken will prove of lasting benefit. Indeed, the advantage of proper instruction, by reason of its educative value to young shot-firers, should reach beyond the immediate purpose of furthering safety in the use of explosives in undertakings now in progress. Except for such instruction the young shot-firer is dependent on what he may learn while assisting one who has been long habituated to the work—but who may or may not be a careful worker. Too often one who has been long immune from accident becomes lax in the observance of safety precautions, and the pupil, in time, unwittingly becomes a missionary of faulty practices.

It is not intended to suggest that shot-firers as a class are careless. Far from it—but they include in their number some who, slipping into careless practices, are a danger to themselves and to their fellow workers. In this connection attention may be called to the issue, by the Department of Labour in the Province of Quebec, of regulations covering the use of explosives elsewhere than in mines and quarries. The use of explosives in mines and quarries is regulated by the Mines Act of the several provinces, but this, it is believed, is the first endeavour to deal with the use of explosives elsewhere. These regulations call for the observance of what is recognized good practice, and, in addition, provide for the issue of shot-firers' permits, without which a man cannot obtain employment as a shot-firer. On this permit each employer is required to enter a record of the man's service, of any accident involving injury which may have occurred in the course of operations conducted by him, and to state whether, in his opinion, the holder exercised reasonable care in the handling of explosives. It may be hoped that the obvious incentive so given to a shot-firer to build up a good record, will put him on guard to observe the regulations and rules of good practice at all times.

*In Mines and Quarries.* The loss of life and the number of persons injured, as the result of accidents in the use of explosives in mines and

quarries, is not disproportionate to the casualties sustained in recent years, if the increased activity in the mining industry is taken into account. The number of workers killed was 15, and 89 were injured, the average for the five years preceding being 16 killed and 56 injured. Both this year and during the same five-year period the loss has been less than that caused by accidents with explosives in other uses, although the quantity of explosives used in mines and quarries may be estimated as twice that used elsewhere. This result, and obtained despite the added hazards inseparable from underground work, speaks well of the effectiveness of the control exercised in the mining industry over the handling of explosives and directed toward the elimination of preventable accidents.

No particular class of accident predominates in the accidents of the year, but as the reports on these, received through the courtesy of Provincial Department of Mines, bring to notice some which were attended by unusual circumstances, occasion is taken to give here a brief record of such as have an interesting bearing on some of the dangers to be avoided in the use of explosives.

Two miners were endeavouring to loosen a drill which had jammed, when a very slight explosion occurred. Suspecting the presence of a possible missed hole they searched the vicinity. Nothing was then visible and they resumed drilling. An explosion followed immediately, inflicting fatal injuries on one of the men and seriously injuring the other. The hole being drilled was a surface one at a mine which, until reopened a few days prior to the accident, had stood abandoned since 1923. On investigation, the socket of an old hole was found at about 18 inches from where the men had been drilling, and it is believed that exuded nitroglycerine from an unexploded charge, or part charge, in the old hole had seeped through cracks, so forming a train, to the new hole and was detonated when reached by the drill.

Two bull-doze charges were placed by a miner on a mill grizzly about 50 feet outside a mine portal. He spit one fuse but having trouble with the second he told his helper he would do the second shot next time. Both men left the grizzly house and entered the portal of the tunnel where, with the crew of a held-up ore train, they awaited the firing. After one charge exploded the shot-firer remarked there was only one shot this time, that all was clear, and moved off. A second shot followed inflicting fatal injuries on the shot-firer. It transpired that he had removed the second charge, believing it unlit, and put it in his hip pocket where it exploded.

Disregard of the blasting regulations limiting the number of shots to be fired by one man in one round—in the case in point the limit was 12 shots—brought injury to a miner, also cancellation of his blasting certificate. He tried to spit 27 holes. The spitter burned to the end before all were lit, upon which he had recourse to his lamp. He completed the work but the first shot fired before he had time to reach his shelter.

To the use of a tamping rod with adhering dried mud and small stones, was attributed a fatal explosion which occurred in a quarry while a hole was being charged.

It is frequently necessary to use explosives to bring down broken ore which may get hung up in a raise and so impede the flow of ore through

the grizzlies. A miner engaged on this task, was observed placing his charge at the end of his blasting pole—preparatory to pushing it into place—when explosion occurred. He was killed and his helper injured. The evidence obtained pointed to the charge having been ignited by the flame of the carbide lamp which had been attached to the miner's overall.

When removing the plank covering from a grizzly, a miner received injuries to his eyes by dust blown into them by a shot fired in a connected chute 200 feet below. Another miner was injured under peculiar circumstances when standing near a diamond drill hole. This apparently had connected with a loaded hole in a stope below and when the shot was fired the man was wounded in the thigh by a piece of debris which passed through the diamond drill hole.

*Miscellaneous Accidents.* Miscellaneous accidents, the most of which arise from playing with explosives, continue to bulk too largely. During the year they accounted, in all, for six deaths and injuries to 46 persons, four persons having lost their lives and 32 sustained injuries consequent to accidents when playing with explosives. Some, but by no means all, of those classed as "various," may be regarded as the outcome of ignorance rather than of carelessness, and some, perhaps, were practically unavoidable. It is rare, however, that one can view those accidents encountered in playing with explosives otherwise than with a very strong suspicion that they are the ultimate and unfortunate result of someone's negligence. Particulars of where and how the explosives involved in these accidents had been obtained are not known in all cases, but the details given in Appendix D would indicate that the train of events, culminating in the death of or injury to some naturally venturesome boy, started on someone's failure to place in security a small quantity of explosives he happened to have in his possession. The average annual loss from accidents in playing with explosives, during the preceding five years, was 2 killed and 48 injured. It is true that the figures for the five-year period anterior to that, to the nearest whole number, were greater—6 killed and 72 injured—but a greater progress than that indicates is to be desired.

The importance of safeguarding small supplies of explosives at places of work, and of ensuring that all are accounted for on cessation of work, is impressed constantly on work parties by inspectors of the Division and by deputy inspectors of explosives of the Royal Canadian Mounted Police, who, in all parts, keep vigilant watch for any work in progress involving the use of explosives. As a result greater care is undoubtedly being taken in these respects, also frequent opportunity is taken by them to instruct and caution school children, as well as their elders, in localities where blasting operations may be conducted. But this does not avail when, as is more common, the danger lies in the retention in and about dwelling houses of a few detonators, or a few sticks of dynamite, years after the owner has had occasion to use explosives. More often than not his own children are the sufferers. It is not practicable to locate and caution all persons who might have small supplies, probably old, in their possession, and one can but hope that, on reading in the newspapers accounts of accidents to children whilst playing with explosives, those, not otherwise reached, may be brought to adopt the simple preventative measure of keeping explosives in locked receptacles.

## APPENDIX A

## Factories Licensed to Manufacture Explosives in 1934

Owner	Location of factory	General nature of product	Remarks
Canadian Industries, Ltd.....	Beloeil, Que.....	Blasting explosives, black powders, propellants.	Operation intermittent.
Canadian Industries, Ltd.....	James Island, B.C..	Blasting explosives, black powders.	
Canadian Industries, Ltd.....	Nobel, Ont.....	Blasting explosives.	
Canadian Industries, Ltd.....	Brainerd, Man.....	Blasting explosives.	
Canadian Industries, Ltd.....	Brownsburg, Que...	Ammunition, detonators, etc.	
Canadian Safety Fuse Co.....	Brownsburg, Que...	Safety fuse.	
T. W. Hand Fireworks Co., Ltd.	Dixie, Ont.....	Fireworks.	
Toronto Fireworks Co., Ltd...	Islington, Ont.....	Fireworks.	
B. Marroni.....	Ville St. Pierre, Que.	Fireworks.....	
Macdonald Metal Products Co., Ltd.	Waterloo, Que.....	Toy pistol caps.	

## APPENDIX B

## Production of Explosives in Canadian Factories during the year 1934

	Quantity
Class I. Gunpowder.....	68,000 lb.
“ II. Nitrate mixtures.....	1,275,765 “
“ III. Nitro-compounds—	
Division 1.....	45,221,879 “
“ VI. *Ammunition—	
Division 1—	
Safety cartridges.....	144,228,395
Safety fuse.....	Output of one factory.
Railway torpedoes.....	Output of one factory.
Percussion caps.....	Output of one factory.
Division 3—	
Detonators and electric detonators.....	Output of one factory.
“ VII. Fireworks—	
Division 2.....	(approx. value) \$114,000

\*Exclusive of artillery ammunition but includes small arms ammunition made in Government factories.

## APPENDIX C

## Explosives Imported into Canada, January 1 to December 31, 1934

Class	Division	Description	Quantity
II	.....	Nitrate mixtures.....	1,100 lb.
III	1	Mixtures containing liquid nitro-compound.....	13,967 "
	2	Nitro-compounds:—	
		(a) Propellants.....	175,181 "
		(b) For use in explosives factories.....	168,416 "
		(c) For other manufacturing purposes.....	886,000 "
VI	1	Percussion caps.....	611,150
	2	Miners' squibs.....	101,000
		Detonating fuse.....	184,409 feet
	3	Detonators and electric detonators.....	1,175
		Fuses (whaling).....	687
		Friction tubes.....	200
VII	2	Manufactured fireworks.....	275,000 lb. (approx.)

# APPENDIX D Accidents from Explosives during the Calendar Year 1934

Circumstances or Cause	Mines and Quarries			Elsewhere			Total	
	Number of		Injured	Number of		Injured	Number of	
	Accidents	Killed		Accidents	Killed		Accidents	Killed
In Use—	16	5	18	13	1	14	29	6
(a) Prematures, and failing to get away from the shot hole.	14	1	14	1	1	1	1	32
(b) Firing by electricity when persons are at the shot hole.	7	1	14	18	2	16	32	1
(c) Not taking proper cover.	6	3	7	39	2	37	46	30
(d) Projected debris.	1	1	4	6	1	6	12	44
(e) Hangfires, and returning too soon to shot hole.	4	1	1	2	1	1	4	10
(f) Tampering with misfired shots.	1	1	13	7	1	7	3	2
(g) Ramming or stemming the charge.	2	2	2	1	2	1	11	3
(h) Sparks, flame, etc.	9	1	14	2	1	1	3	20
(i) Bores into unexploded charge.	1	1	1	4	1	7	11	3
(j) Striking unexploded charge in removing debris.	1	1	1	8	1	9	9	17
(k) Preparing charges.	1	1	1	1	1	1	1	7
(l) Lighting fuse before inserting charge.	1	1	1	3	1	2	1	10
(m) Fumes.	2	3	2	4	3	1	5	1
(n) Springing or socketing shots.	11	3	11	4	3	3	15	4
(p) Various.	75	15	89	108	15	107	183	14
In Manufacture.								196
In Keeping.							3	1
In Conveyance (other than by railway).							1	2
								1
							*4	2
								2
Miscellaneous—								
(a) Playing with detonators.							21	2
(b) Playing with other explosives.							10	24
(c) Various.							9	8
								14
Totals, all circumstances.	75	15	89	108	15	107	†40	6
							227	38
								244

\*Except for these, accounts of which are given in the text, the accidents given in this table occurred in circumstances not directly controlled by the Act.

†Circumstances are given on next page.

# APPENDIX D—Continued Playing with Detonators

Cause of Accident	Killed	Injured
Boy, age 13, placed on a school stove a detonator which his brother had taken from a neighbour's garage. He lost first joint of thumb and two joints of first finger of right hand by the explosion which followed.....		1
Two boys, ages 17, 11, found detonators in a barn. The elder placed one in a vice and filed it. It exploded. The younger boy lost one eye. Both received minor injuries.....		2
Two boys found 150 detonators in bed of old creek, near school. They exploded them, a few at a time, by placing on a rock and throwing other rocks at them, until one boy was slightly injured in left leg by flying particles.....		1
Boy, age 12, entered a warehouse in rear of a general store and found two boxes partly full of detonators which he took. Meeting his elder brother he lit a match, before he could be stopped, to show contents of box. There was an explosion. He received injuries to which he succumbed and his elder brother received minor cuts.....	1	1
Children, ages 12, 8, 6, found box of detonators, left behind by previous tenant, in cellar of house. One child pounded a detonator with a rock. By the explosion which followed he lost parts of two fingers. The other two children received minor injuries.....		3
Boy, age 11, found detonator on lake shore. He applied a match to it. He lost all fingers of left hand and received other injuries by the explosion.....		1
Boy found detonators and fuse on beach. He set off 3 or 4 with fuse, then tried to open one with his knife. He lost sight of left eye, also thumb and first finger of left hand.....		1
Lad, age 16, while playing with detonators exploded one. He lost two fingers of his right hand.....		1
Boy, age 8, playing in granary, found box of detonators on rafter. He took one detonator, placed it on a sled and struck it with a stick. It exploded. He died from injuries.....	1	
Boys, ages 12 and 9, entered a locked building by a window and obtained a box containing six detonators. One boy held a detonator in his right hand while the other boy set a match to it. He lost thumb and 3 fingers of right hand. The second boy received minor injuries.....		2
Boy, age 13, took some detonators from an unlocked box on a farm, where he was working. He applied a light to one. It exploded. He lost thumb and first finger of left hand.....		1
Boy, age 11, drew a detonator across a red hot stove. He lost three fingers of right hand by the explosion.....		1
Boy, age 14, pounded a detonator with a rock, believing it to be an empty tube. It exploded, blowing off three fingers of his right hand.....		1
Boy, age 14, found a detonator among assortment of goods his father had bought at an auction sale. He applied a match to it and lost thumb and first finger of left hand by the explosion.....		1
Boy, age 12, was given a detonator by a companion who had found some in a cash box in his home, where they had been for eight years. He laid it on a stone and struck it with a rock. The detonator exploded, blowing pieces of rock into his chest.....		1
Boy, age 9, given detonator by companion who had taken it from a tin in the kitchen of his home, was playing with it at school when it exploded. He lost middle finger and parts of two other fingers of one hand.....		1
Man, cook at camp, was amusing himself by firing detonators. One exploded in his hand. He lost two fingers.....		1
Boy found two detonators in his father's shed. While playing with them one exploded. He lost an eye and had his hand badly lacerated.....		1
Boy, age 14, lost first finger and injured two others when a detonator exploded in his hand while he was playing with it.....		1
Man found detonators on farm, where he was employed. He was ignorant of their nature, but was told they were detonators. He attached fuse and started exploding them. One detonator exploded in his hand. He lost two fingers and thumb of left hand.....		1
Boy, age 10 was given a detonator by a companion who had found it near school. In trying to remove composition with a needle he exploded it and lost first and second fingers and thumb of left hand. About 18 months previously contractors had been working at the place where detonator was found.....		1
	2	24

### APPENDIX D—*Concluded* Playing With Other Explosives

Cause of Accident	Killed	Injured
<i>Powders:—</i>		
Boy, age 14, was ramming a charge, consisting of a mixture of sulphur and potassium permanganate, into a toy cannon when it exploded and burst the cannon. Fingers and palms of both hands were severely torn.....		1
Lad, age 17, while experimenting with some gunpowder, in his home, caused it to explode. He lost the tip of his left thumb.....		1
Boy, extracted the powder from shotshells, applied a match and was burned about face and hands.....		1
<i>Railway Torpedoes:—</i>		
Boy, age 7, undetected by workmen having lunch nearby, took three torpedoes from box on hand car and later placed one on a rock and hit it with a stone. He received injuries to arms and eyes.....		1
Boy, struck railway torpedo with a hammer. He received a deep cut on the nose from a fragment thrown by the explosion.....		1
Boy, age 7, found railway torpedo in garbage and struck it with an axe. The axe flew up and hit him on the head. He died from injuries.....	1	.....
<i>War Relic:—</i>		
Boy, age 10, was playing with fuse of 18 pr. shell, a war souvenir, when it exploded. He was cut about the arms and neck.....		1
<i>Fireworks:—</i>		
Girl, age 7, with a number of other children, was setting off toy caps, by pounding them with stones. Her dress caught fire. She died from the effects of the burns sustained.....	1	.....
Boy, during recess at school, placed a squib in his pocket, for later use. It ignited other fireworks. He was slightly injured.....		1
Boy, age 14, was walking with his pocket full of fireworks when another boy placed a lighted match among them. He was badly burned by the explosion.....		1
	2	8

### Various Accidents

Cause of Accident	Killed	Injured
Man, while searching in a "grub box" for a candle, let the lighted match he was holding fall into an open can containing gun powder. He was severely burned about face.....		1
Man, while warming himself at fire in a gravel pit, observed a box of detonators near a powderman who was cutting fuses in the vicinity. He picked it up and an explosion followed. Cause unknown. He died of injuries.....	1	.....
Boys were injured while firing caps and powder extracted from revolver cartridges, which they had found under water in an old culvert.....		2
Woman had just lit a fire in her stove, when there was an explosion which wrecked the kitchen. She sustained cuts to legs and head, also a broken finger. Dynamite suspected, and possibly placed with malicious intent.....		1
Man searching with a lighted flare for a lost twenty dollar bill, near a fireworks display then in progress, caused an explosion. Six children suffered severe burns.....		6
Man lit smudge for flies, when there was an explosion. It is believed there was a stick of dynamite in the smudge. He was injured.....		1
Man and his three year old son were watching refuse being burned at a city dump. An explosion in the refuse threw burning embers on them and they sustained severe burns.....		2
A man, engaged in destroying old detonators by fire, approached the fire, believing all had exploded, and was slightly injured by the delayed explosion of one.....		1
A lighthouse keeper, was killed while dynamiting fish.....	1	.....
	2	14

## APPENDIX E

## Authorized Explosives

Explosives manufactured by Canadian firms as hereunder detailed:—

Burrowite Explosives, Ltd.

Burrowites Nos. 1, 2, and 3.

Canadian Industries, Ltd.

Polar dynamite—25, 30, 35, 40, 50, and 60 per cent.

Polar Mineite—35, 40 per cent.

Polar Ammonia Dynamite—20, 25, 30, 35, 40, 50, and 60 per cent.

Polar Stopeite—20, 25, 30, 35, 40, 50, 55, and 60 per cent.

Polar Gelatinized Dynamite—50, 60, and 75 per cent.

Polar Forcite Gelatin—30, 35, 40, 50, 60, 75, 80, and 90 per cent.

Giant Gelatin—30, 35, 40, 50, 60, 75, 80, and 90 per cent.

Polar Monobels, Nos. 4, 6, 7, 12, and 14.

Polar CXL-ite No. 2.

Polar Cilgel.

Gelatin Dough.

C. X. L. Special Gelatin No. 1.

C. X. L. Special Dynamite No. 1 and No. 2.

Polar Stumping No 1 and Extra.

Blastol.

S. N. G.

Gypsumite "A" and "B."

Cordite.

Black Blasting Powders.

Black powder pellets.

Gunpowder.

Sporting powders.

Safety fuse powders.

Safety fuse lighters.

Signal bombs.

Canadian Safety Fuse Co., Ltd.

Safety fuse—"Clover" brand.

Safety fuse—"Black Clover" brand.

Safety fuse—"Beaver" brand.

Safety fuse—"White Jacket" brand.

Safety fuse—"Crown" brand.

Safety fuse—"Moose" brand.

Safety fuse—"Pacific" brand.

Canadian Industries, Ltd. (Dominion Ammunition Divn.)

Ammunition.

Detonators.

Lead Azide.

Lead Trinitroresorcinate.

Percussion caps.

Railway torpedoes.

Electric detonators.

Railway fusees.

All explosives on the British authorized list are provisionally authorized in Canada, and in addition, those manufactured by the following firms, as detailed below:—

Aetna Explosives Co., Inc., New York.

Standard dynamite L.F.—15, 20, 25, 27, 30, 33, 35, 40, 45, 50, and 60 per cent.

Straight dynamite—15, 20, 25, 27, 30, 33, 35, 40, 45, 50, and 60 per cent.

Keystone standard gelatin—40, 60, and 75 per cent.

Stumping powders—20 and 30 per cent.

American Glycerine Co., Findlay, Ohio.

Nitroglycerine.

APPENDIX E—*Continued*

## Authorized Explosives

- American Powder Co., Maynard, Mass.  
American R.C. 22 short.
- Atlas Powder Co., Wilmington, Del.  
Electric blasting caps, Nos. 6, 7, and 8.  
Blasting caps, Nos. 6, 7, and 8.  
Nitrocellulose.  
Trinitrotoluene.
- Brücker and Zinke, Meissen, Germany.  
Safety fuse—"Globe" brand.
- Brücker and Zehetzsche, Minden, Germany.  
Safety fuse—black fuse "Triumph" brand.  
Safety fuse—white fuse "Triumph" brand.
- California Cap Co., Oakland, Cal.  
Detonators.
- Dumore National Chemical Co., Seattle, Wash.  
Regina stumping powder Nos. 1 and 2.  
Regina rock powder Nos. 1 and 2.
- E. I. Dupont de Nemours & Company, Inc., Wilmington, Del.  
Dupont bulk rifle powders (Nos. 80, 90, 91, 92) Rifle No. 1. Schuetzen.  
Dupont smokeless shotgun powder.  
Dupont pistol powders Nos. 3 and 5.  
Dupont sporting rifle powders Nos. 93, 95 and 96.  
Dupont military rifle powders (M.R. No. 20-23) Nos. 10, 21, 22, 30, 40, and 50.  
Dupont gallery rifle powder No. 75.  
Dupont Schultze smokeless shotgun powder.  
Ballistite smokeless shotgun powder.  
Improved military rifle powders Nos. 13, 15, 15½, 16, 17, 17½, 18, 23, 25, and 25½.  
Dupont dense smokeless shotgun powder.  
Fulminate of mercury.  
Guncotton.  
Trinitrotoluene.  
Dynamite and blasting gelatin.  
Agritol.
- Ensign-Bickford Co., Simsbury, Conn.  
Cordeau-Bickford fuse.
- Hercules Powder Co., Wilmington, Del.  
Bullseye revolver powder.  
Infallible smokeless shotgun powder.  
Dynamite and blasting gelatin.
- Illinois Powder Manufacturing Co., St. Louis, Miss.  
Ammonia dynamite—40 and 60 per cent.  
Powertol No. 1 and No. 3.
- Independent Eastern Torpedo Co., Findlay, Ohio.  
Nitroglycerine.
- King Powder Co., King's Mills, Ohio.  
Semi-smokeless powder.
- Maison Farman, Billancourt, France.  
Farman airplane starting cartridge.
- Poudreries Reunies, Brussels.  
Safety fuse—"Shamrock" brand.
- John R. Powell, Plymouth, Pa.  
Miners' squibs.

**APPENDIX E—Continued****Authorized Explosives**

- Puget Sound and Alaska Powder Co., Seattle, Wash.  
 Gelatin dynamite—25, 30, 35, 40, and 60 per cent.  
 Dynamite, L.F.—20, 30, 40, and 60 per cent.  
 Special gelatin—25, 30, 40, and 60 per cent.  
 Straight gelatin—25, 30, 40, and 60 per cent.  
 Special stumping dynamite.  
 Special stumping dynamite—20 and 30 per cent.  
 Special dynamite—40 and 60 per cent.  
 Straight dynamite—40 and 60 per cent.
- Safety Mining Co., Chicago, Ill.  
 Cardox.
- Trojan Powder Co., Allentown, Pa.  
 Trojan blasting CC.  
 Trojan TL 502.  
 Trojan 35 per cent standard.  
 Trojan 40 per cent standard.  
 Trojan 40C.  
 Trojan 50C.
- United Railway Signal Corporation, Newton, Mass.  
 Railway torpedoes.
- Western Cartridge Co., East Alton, Ill.  
 Detonators.

**Authorized Explosives (Manufactured Fireworks)**

Manufactured fireworks on the British authorized list are provisionally authorized in Canada.

- All fireworks as manufactured by the following Canadian makers are authorized:  
 Macdonald Metal Products Company Ltd., Waterloo, Que.  
 Marroni, Berardo, St. Pierre, Que.  
 Toronto Fireworks Co. Ltd., Islington, Ont.  
 T. W. Hand Co., Ltd., and Dominion Fireworks Co., Dixie, Ont.

Certain fireworks manufactured by the following foreign makers are authorized:

**Germany:**

- Blumberg and Co., Dusseldorf.  
 Eisfeld, J. F., Silberhutte, Anhalt.  
 Eckhardt, C. F., Nuernberg.  
 Fischer, Wilhelm, Worbis, Wurtemberg.  
 Geb. Weinrich, Worbis, Thuringen.  
 Gerka-Werke, Offenbach on Main.  
 Hamburg-Bremer Handelgesellschaft, Hamburg.  
 Nicolaus H. and Co., Memingen, Thuringen.  
 Trummer and Co., Hamburg.  
 Wickes, Fred, Barmen.

**Japan:**

- Hirono Shoten, Kobe.

**United States:**

- American Fireworks Co., Boston, Mass.  
 Antonelli Fireworks Co., Rochester, N.Y.  
 Backes, M. Sons Inc., Wallingford, Conn.  
 Burke and James Inc., Chicago.  
 Central Railway Signal Co., Boston, Mass.  
 Continental Fireworks Manufacturing Co., Dunbar, Pa.  
 Coston Supply Co., New York.  
 Edmiston Manufacturing Co., Columbus, Ohio.

**APPENDIX E—Concluded****Authorized Explosives (Manufactured Fireworks)****United States:—Concluded**

Edwards Co., Cincinnati.  
 Essex Specialty Co., Berkeley Heights, N.J.  
 Federal Buster Corporation, Pittsburgh.  
 Hitt Fireworks Co. Inc., Seattle.  
 International Fireworks Co., New York.  
 International Flare Signal Co., Tippecanoe City, Ohio.  
 Jedel, A., Newark, Del.  
 Kilgore Manufacturing Co. Inc., Westerville, Ohio.  
 Los Angeles Fireworks Co., Los Angeles.  
 Marshall, John C., Brooklyn, N.Y.  
 National Fireworks Inc., West Hanover, Mass.  
 New Jersey Flugent Co., New Brunswick, N.J.  
 Norman Willets Photo Supply Co., Chicago.  
 Potts Fireworks Display Co., Franklin Park, Ill.  
 Rochester Fireworks Co., Rochester, N.Y.  
 Safety Automatic Toy Co., Dayton, Ohio.  
 Standard Railway Fuse Corporation, Boonton, N.J.  
 Triumph Fusee and Fireworks Co., Elkton, Md.  
 Unexcelled Manufacturing Co., Inc., New York.  
 Victory Fireworks and Specialty Co., Elkton, Md.

Small Chinese fireworks and Chinese firecrackers with gunpowder composition, and not exceeding 4 inches in length and nine-sixteenth inch in diameter are authorized, when found to function satisfactorily on examination at port of entry.







